

A.D. 1869, 19th JANUARY. N° 171.

Driving Piles.

LETTERS PATENT to Henry Woodcroft Hammond, of 43, Princess Street, in the City of Manchester, in the County of Lancaster, Engineer, for the Invention of "IMPROVEMENTS IN THE MODE OF AND IN APPARATUS OR MECHANISM FOR DRIVING PILES."—A communication from abroad by Philip Syng Justice, of the City and County of Philadelphia, in the State of Pennsylvania, United States of America.

Sealed the 1st June 1869, and dated the 19th January 1869.



PROVISIONAL SPECIFICATION left by the said Henry Woodcroft Hammond at the Office of the Commissioners of Patents, with his Petition, on the 19th January 1869.

I, HENRY WOODCROFT HAMMOND, of 43, Princess Street, in the City
5 of Manchester, in the County of Lancaster, Engineer, do hereby declare
the nature of the said Invention for "IMPROVEMENTS IN THE MODE OF AND
IN APPARATUS OR MECHANISM FOR DRIVING PILES," a communication from

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abroad by Philip Syng Justice, of the City and County of Philadelphia, in the State of Pennsylvania, United States of America, to be as follows :—

The object of the Invention is to drive piles more rapidly, forcibly, and economically than has been done by means hitherto used, and the 5 Invention consists in applying the force of gunpowder or other explosive materials to act between a cap or cylinder upon the pile to be driven, and a ram or hammer arranged in suitable guides so as to force the pile downwards and the hammer upwards, the hammer being arrested and held at its greatest elevation until the next blow is required, being then 10 allowed to fall, and by its fall to drive the pile and explode the charge placed in the cylinder, which still further forces down the pile and at the same time lifts the hammer for the next blow.

The apparatus or mechanism employed consists of a vertical tube or column upon a suitable base, the tube having a longitudinal slot in it 15 from top to bottom to form guides for the hammer and cylinder. The cylinder has a recess in its under side to fit the head of the pile upon which it rests, and in the upper side of the cylinder a hole or cavity is formed to receive the charge of explosive material and fulminating powder. The hammer has a rod or plunger formed on it with a nipple 20 upon its end, which is so arranged that when it falls it will enter the hole in the end of the cylinder and explode the charge. There is a toothed rack secured to the side of the tube, and upon the hammer a pawl is jointed so that it will enter the teeth of the rack on the ascent of the hammer and prevent its descent until required. The pawl is pressed 25 towards the teeth of the rack by a spring which acts to catch upon the pawl, and hold and prevent it from entering the teeth of the rack during the descent of the hammer, the momentum or downward force of the tail of the pawl, and of the spring releasing the pawl from the spring catch when the blow is struck. A buffer or other spring is secured at 30 the upper end of the tube to prevent the hammer from ascending too high.

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SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Henry Woodcroft Hammond in the Great Seal Patent Office on the 14th June 1869.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, HENRY
5 **WOODCROFT HAMMOND**, of 43, Princess Street, in the City of Manchester, in the County of Lancaster, Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Nineteenth day of January, in the year of our Lord One thousand eight hundred and sixty-nine, in the thirty-
10 second year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Henry Woodcroft Hammond, Her special licence that I, the said Henry Woodcroft Hammond, my executors, administrators, and assigns, or such others as I, the said Henry Woodcroft Hammond, my executors, administrators, and assigns, should
15 at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for
“**IMPROVEMENTS IN THE MODE OF AND IN APPARATUS OR MECHANISM FOR DRIVING**
20 **PILES,**” (a communication to him from abroad by Philip Syng Justice, of the City and County of Philadelphia, in the State of Pennsylvania, United States of America, upon the condition (amongst others) that I, the said Henry Woodcroft Hammond, my executors or administrators, by an instrument in writing under my, or their, or one of their hands,
25 and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

30 **NOW KNOW YE**, that I, the said Henry Woodcroft Hammond, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the Drawings hereunto annexed, and to the letters and figures marked thereon (that
35 is to say) :—

This Invention relates to driving piles more rapidly, forcibly, and economically than has been done by means hitherto used, and consists

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in applying the force of gunpowder or other explosive materials to act between a cap or cylinder upon the pile to be driven, and a ram or hammer arranged in suitable guides so as to force the pile downwards and the ram upwards, the ram being arrested and held at its greatest elevation by means of a rack and paul until the next blow is required, 5 when it is allowed to fall, and by its fall to drive the pile and explode the charge in the cylinder, which still further forces down the pile, and at the same time lifts the ram for the next blow.

In order to enable others to use and practice the Invention, I describe its construction and operation thus,— 10

On reference to the accompanying Drawings, which form a part of the Specification, Fig. 1 represents a front view of pile driver with a ram with only one plunger and a spring or elastic buffer, while Fig. 2 shews a ram with 2 plungers and an atmospheric cylinder or buffer.

A, Fig. 1 represents a vertical tube or column upon a cast-iron base B, 15 which tube or column has a longitudinal slot in it from top to bottom to form guides for the ram G and cylinder R; the cylinder R has a recess or chamber T in its under side to fit the head of the pile upon which it rests, and in the upper side of the cylinder a hole or cavity S is formed to receive the charge of explosive material and fulminating powder; the 20 ram G has a rod or plunger O with a nipple P on it, which is so arranged when it falls it will enter the cavity or chamber S and explode the charge; there is a toothed rack C secured to the side of the tube or guides, and a paul I screwed or jointed upon the ram G at K, which prevents its descent until required; M and N are pins to limit the 25 amount of stroke of paul I; the paul I is pressed towards the teeth of the rack by a spring L which acts to catch upon the paul and hold and prevent it from entering the teeth of the rack during the descent of the ram, but which the momentum or downward force of the tail of the paul and of the spring again released; F is a spring or elastic buffer 30 to limit the upward stroke; and D is a ring; and E a cap for ornament.

In Fig. 2, A is the lower plunger for entering into percussion chamber or cavity S in cylinder R; B is the ram; C is the upper plunger for cushioning in air cylinder K; D is a paul jointed to ram for catching in rack I; E is a spring for forcing the paul against the rack; F is a 35 pulley to work the cord G; G is a cord, one end of which is attached to the paul, and the other in the hands of the operator to allow the descent of the ram; H is a spring to hold the paul from the rack; I is a rack

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secured to one of the guides J; J are the guides; K is an air cylinder in which the upper plunger C cushions; L is a pulley over which a rope may be passed to hoist the piles into place; M is a weight to release the paul from the spring when the blow has been struck; and N is an air
5 valve opening inwards in cylinder K.

Having now particularly described my Invention, and the manner in which the same is to be performed, I wish it to be understood that the guides need not be constructed from a tube or cylinder, nor yet is it absolutely necessary that the rack should be fixed upon the guides, and the
10 paul upon the ram; for if the rack was transposed to the ram and the paul to the guides, the alteration would not effect the result; in a like manner a transposition might be made with the chamber or cavity S and the plunger O; I therefore do not confine myself to the exact shape of apparatus, but what I do claim under the above recited Letters Patent
15 is,—

Firstly. The employment of gunpowder or other explosive materials to operate a ram in manner and for the purpose described.

And, secondly. The employment of a paul in combination with a spring and rack when operating as herein set forth.

20 In witness whereof, I, the said Henry Woodcroft Hammond, have hereunto set my hand and seal, this Fourteenth day of June, in the year of our Lord One thousand eight hundred and sixty-nine.

HENRY WOODCROFT HAMMOND. (L.S.)

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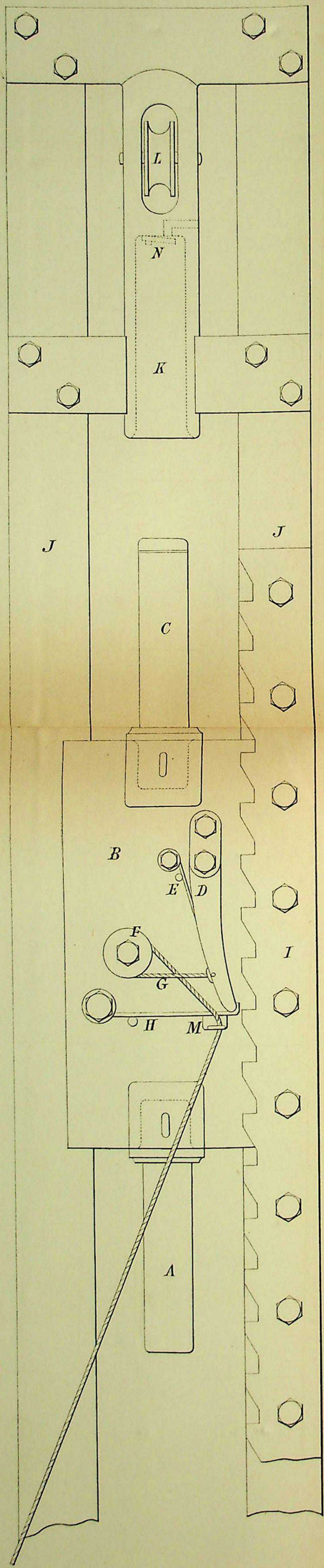


FIG. 2.

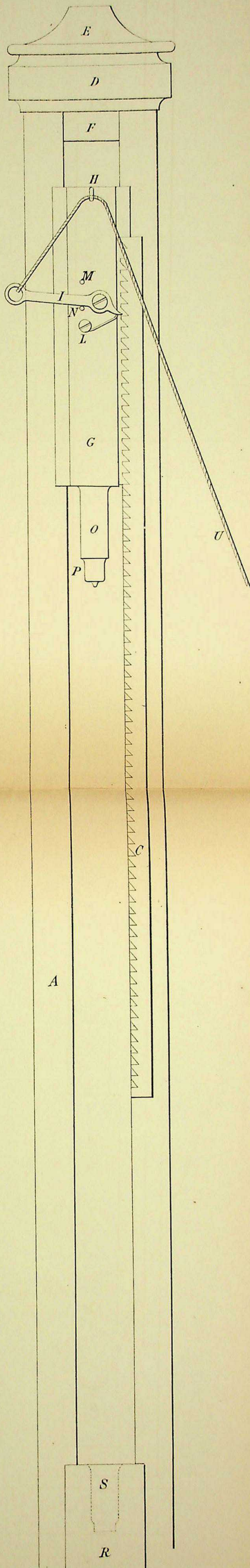


FIG. 1.

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FIG. 2.

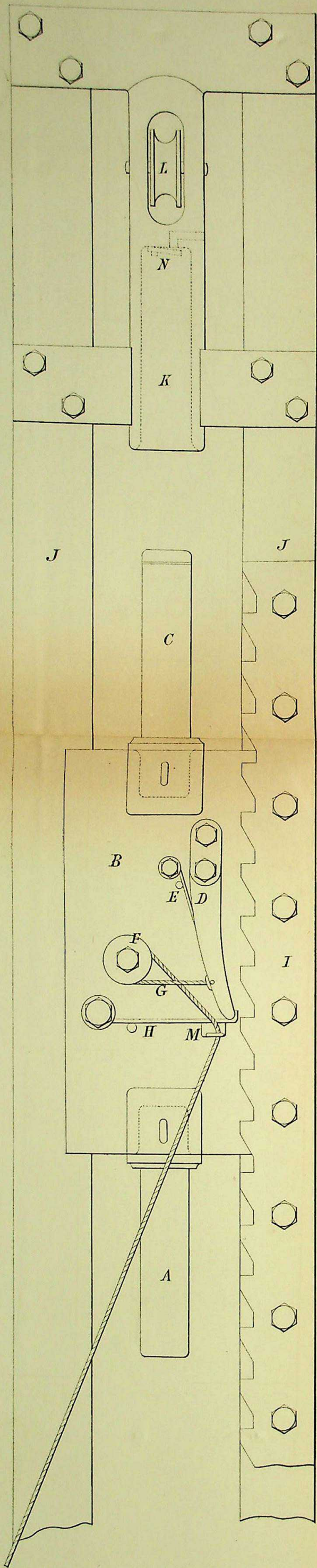
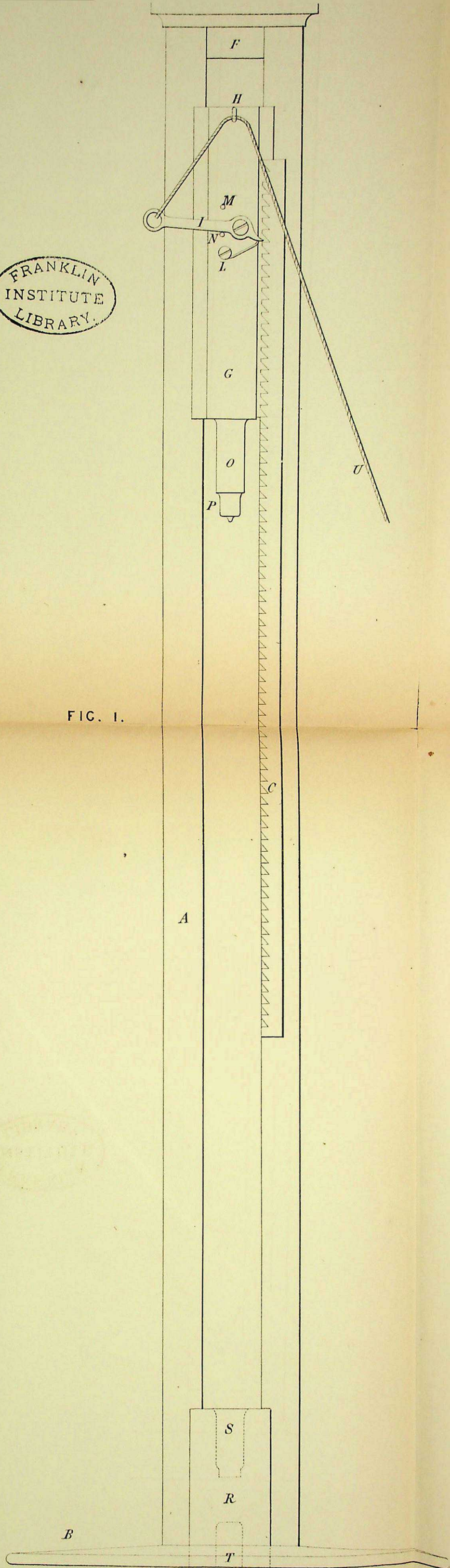


FIG. 1.



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